Air Quality Permitting
Statement of Basis

June 11, 2007

Permit to Construct No. P-2007.0078

Doloughan Construction, LLC,
dba Lost River Ready Mix
Salmon, ID

Facility ID No. 777-00415
(Portable Concrete Batch Plant, “Mackay Plant”)

Prepared by:

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AIR QUALITY DIVISION

PROPOSED FOR PUBLIC COMMENT

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Acronyms, Units, and Chemical Nomenclatures

acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
CFR	Code of Federal Regulations
CO	carbon monoxide
cy	cubic yards
cy/day	cubic yards per day
cy/yr	cubic yards per consecutive 12-month period
dba	doing business as
DEQ	Department of Environmental Quality
EI	emissions inventory
EPA	U.S. Environmental Protection Agency
HAPs	Hazardous Air Pollutants
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
IFRO	Idaho Falls Regional Office
m	meter(s)
$\mu g/m^3$	micrograms per cubic meter
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NOx	nitrogen oxides
NSPS	New Source Performance Standards
PERF	Portable Equipment Relocation Form
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
Rules	Rules for the Control of Air Pollution in Idaho
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SO_2	sulfur dioxide
SOx	sulfur oxides
T/yr	tons per year
TAPs	toxic air pollutants
VOC	volatile organic compound

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, Rules for the Control of Air Pollution in Idaho, for issuing permits to construct. This is an initial permit for this facility.

2. FACILITY DESCRIPTION

Doloughan Construction, LLC dba Lost River Ready Mix (Lost River) operates a portable truck mix concrete plant referred to as the "Mackay Plant." The plant's maximum capacity is 75 cubic yards of concrete per hour (cy/hr), with a maximum production of 100,000 cubic yards of concrete per year (cy/yr). The facility does not include a generator; electrical power for the facility is provided by the local utility.

Concrete is produced by combining water, cement, sand (fine aggregate) and gravel (coarse aggregate). Supplementary cementing materials, also called mineral admixtures or pozzolan minerals may be added to make the concrete mixtures more economical, reduce permeability, increase strength, or influence other concrete properties. Typical examples are natural pozzolans, fly ash, ground granulated blast-furnace slag, and silica fume, which can be used individually with Portland or blended cement or in different combinations. Chemical admixtures are usually liquid ingredients that are added to concrete to entrain air, reduce the water required to reach a required slump, retard or accelerate the setting rate, to make the concrete more flowable or other more specialized functions.[1]

A portable concrete batch plant consists of storage bins or stockpiles for the sand and gravel, storage silos for the cement and cement supplement, weigh bins that weigh each component, conveyors, a water supply, and a control panel. Sand and gravel are either produced on site or purchased elsewhere. Typically, three or four different sizes of gravel and one or two different sizes of sand are stockpiled for varying job specifications. Cement and supplementary cementing materials are delivered by truck and pneumatically transferred to the appropriate storage silo. A baghouse or dust collector is mounted above each silo to capture cement or cement supplement as air is displaced in the silo. For this source category, the baghouse is considered primarily as process equipment, with a secondary function as air pollution control equipment.

After all the storage bins are filled, the production process begins when sand and gravel are drop-fed into their respective weigh bins. When a pre-determined amount of each is weighed, the aggregate is heavily wetted for better mixing and to minimize fugitive dust prior to being dropped onto a conveyor, which transfers the mixture into either a truck for in-transit mixing or a truck mix drum for mixing onsite. A predetermined amount of cement and cement supplement is also weighed and drop-fed through a chute into the mixer. The chute provides a measure of dust control. Sometimes a separate baghouse is used to capture dust from the weigh bins. Water is then added to the truck mix or central mix drum.

3. FACILITY / AREA CLASSIFICATION

The Mackay Plant portable concrete batch plant is not a major facility as defined in IDAPA 58.01.01.205, nor is it a designated facility as defined in IDAPA 58.01.01.006, nor is it subject to any NSPS, NESHAP, or MACT requirement (see details at IDAPA 58.01.01.008.10.c.ii). Fugitive emissions, therefore, are not included for the purposes of determining the facility classification.

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[1] AP-42 Section 11.12, November 29, 2005 draft.

Table 3.1 shows the estimated emissions of particulate matter (PM), criteria air pollutants (which includes only PM_{10} for this facility) and hazardous air pollutant (HAP) emissions from the concrete batch plant for Aerometric Information Retrieval System (AIRS) facility classification purposes. This portable concrete batch plant is classified as a minor facility because, as shown in the table, the estimated emissions are less than major source thresholds without imposing limits on the facility operations. The AIRS classification is therefore "B."

The facility is a portable facility and may locate anywhere in the state of Idaho except in any PM_{10} nonattainment area. A relocation form must be completed and submitted to DEQ prior to any relocation.

The AIRS information provided in Appendix A defines the classification for each regulated air pollutant for this portable concrete batch facility. This required information is entered into the EPA AIRs database.

Table 3.1 FACILITY CLASSIFICATION EMISSION ESTIMATES [a]

Emission Source	PM (total) (T/yr)	PM_{10} (T/yr)	HAPs (total) (T/yr)	Any HAP (T/yr)
Major Source Thresholds	250 (PSD)	100 (Tier I)	25 (Tier I)	10 (Tier I)
Truck Mix Concrete Batch Plant Emissions (point sources only)	1.77	0.15	0.013	0.006 (Manganese)

[a] Facility Classification emissions are based on operation at 75 cy/hr for the batch plant for 8,760 hrs/year, with baghouses treated as process equipment.

4. APPLICATION SCOPE

Lost River has requested authorization to operate this portable concrete batch plant in Idaho, and has requested that this portable plant be allowed to operate at 75 cy/hr, with maximum concrete production limited to 1,800 cy per day and 10,000 cy per year. The production rate requested in the application was 10,000 cubic yards per year, but the applicant also requested during the pre-application meeting that DEQ increase this level as appropriate based on the results of the DEQ-developed emissions inventory and generic modeling.

4.1 Application Chronology

April 25, 2007	Lost River consulted with DEQ through the DEQ Permitting Hotline, and requested DEQ assistance in developing the emissions inventory and modeling. DEQ determined that the proposed project met the criteria to use the current generic concrete batch plant modeling for this application.
May 7, 2007	Pre-application meeting at State DEQ office in Boise. Written modeling protocol (request to use the DEQ generic modeling) was approved by DEQ during this meeting. PTC application, Portable Equipment Relocation Form (PERF), $1,000 application fee, and confirmation of scheduled publication date for the applicant's required public meeting were provided at the end of this meeting. The application will not be considered "received" until final confirmation of the publication notice is received.
May 10, 2007	Receipt of affidavit of publication for applicant's public meeting notice. Application determined to be complete and 15-day pre-permit construction approval was issued.

May 10, 2007	Draft permit and statement of basis sent electronically to the Idaho Falls Regional Office for review and comment. Minor comments were received on May 11.
May 21, 2007	Applicant-held public information meeting scheduled in Salmon.
May 25, 2007 through June 8, 2007	15-day opportunity for public comment period.
May 29, 2007	Draft permit and statement of basis sent electronically to the facility.
June 6, 2007	Receipt of a request for a public comment period.
June 7, 2007	Receipt of $1,000 processing fee.

5. PERMIT ANALYSIS

This section of the Statement of Basis describes the regulatory requirements for this PTC action.

5.1 Equipment Listing

Table 5.1 contains the equipment listing and the emissions controls.

Table 5.1 EQUIPMENT LISTING AND EMISSIONS CONTROLS

Source Description	Emissions Control(s)
<u>Concrete Batch Plant – Truck Mix</u> Manufacturer: Doloughan Construction and England Welding Mfr Date: 2007 Model: Dry Concrete Batch Maximum production capacity: 75 cubic yards of concrete per hour (cy/hr)	<u>Cement Storage Silo Baghouse/Cartridge Filter #4</u>: Manufacturer: Fastway Model: --- Control Efficiency: 99.8% Stack Parameters: Height: 36.7 feet (~11.2 meters) Exit Diameter: 8.4 feet Exit air flow rate: 2,450 cfm (max) *<u>Storage Silo Baghouse/Cartridge Filter Stack</u>:*[a] *Height: Minimum 10 meters (32.8 ft)* *Exit Diameter: ---* *Exit air flow rate: ---* *Control Efficiency: minimum 99%* <u>Weigh Batcher</u>: Manufacturer: Doloughan Construction and England Welding Boot, Enclosure, or equivalent Control Efficiency: 95% estimated <u>Truck Loadout Rubber Boot Enclosure</u> Control Efficiency: 95% estimated <u>Material Transfer Point Water Sprays</u> (Manual sprays, sprinklers, or water bars used to wet aggregate, aggregate is washed before delivery to batch plant site) Control Efficiency: 75% estimated

[a] *The initial facility components did not include a cement supplement silo. The DEQ emissions inventory and generic modeling analysis, however, include emissions from this point source. The facility could add one or more cement or cement supplement silos with baghouses or cartridge filters (that meet the minimum criteria shown in this table) without modifying this permit.*

5.2 Emissions Inventory

The emissions inventory provided in the application for this portable concrete batch plant was developed by DEQ based on AP-42 Section 11.12 emission factors for a truck-mix concrete batch plant, and the following assumptions: 75 cubic yard per hour (cy/hr) concrete production capacity, with maximum concrete production limited to 1,800 cy per day and 100,000 cy per year.

Fugitive emissions of particulate matter (PM) and PM_{10} from material transfer points were assumed to be controlled by manual water sprays, sprinklers, or spray bars that reduce the emissions by an estimated 75%. Aggregate is washed before delivery to the batch plant site, and water is used on-site to control the temperature of the aggregate. Particulate matter (PM) and PM_{10} emissions from the weigh batcher transfer point and truck mix loadout are controlled by a boot, enclosure, or equivalent. Capture efficiency of the weigh hopper boot or equivalent was estimated at 95%. Capture efficiency of the truck mix loadout boot or equivalent was estimated at 95%. Fugitive emissions from vehicle traffic and wind erosion from storage piles were not estimated.

Controlled emissions of toxic air pollutants (TAPs) were estimated based on the presence of baghouses on the cement and cement supplement silos, and 95% control for truck loadout emissions. Hexavalent chromium content was estimated at 20% of total chromium for cement, and 30% of total chromium for the cement supplement/flyash.

The detailed EI for this concrete batch plant can be found in Appendix B.

5.3 Modeling

Based on the emissions inventory, the potential emission rate of PM_{10} from this facility from point sources and transfer points was estimated at 0.6 lb/hr (24-hour average) and 0.4 tons/yr. These levels exceed the published DEQ modeling thresholds[2] for PM_{10} of 0.2 lb/hr (24-hour average), but do not exceed annual threshold of 1.0 tons/year. Modeling was therefore required for short-term ambient impacts.

During the pre-application consultation, DEQ determined that this proposed project met the criteria to use DEQ's generic concrete batch plant modeling results to demonstrate preconstruction compliance with NAAQS and toxic air pollutant (TAP) rules. This determination was based on the information provided in Table 5.1. DEQ's modeling analysis report is included as Appendix C.

DEQ determined that the slightly shorter proposed height for the weigh batcher emission point is acceptable in this case. The weigh batcher emissions do not significantly contribute to the ambient air impact compared to the truck loadout and fugitives emissions.

Table 5.1 CRITERIA FOR USING DEQ'S GENERIC CONCRETE BATCH PLANT MODELING RESULTS FOR AIR IMPACT ANALYSES

Parameter	DEQ Model	Proposed Project	Comments
Concrete batch plant type	Truck mix or central mix (redi-mix or dry mix)	Truck mix	Meets
Operation in any PM_{10} nonattainment area.	Not proposed.	Not proposed.	Meets
Presence of an electric generator.	No generator.	No generator.	Meets

[2] Table 1, State of Idaho Air Quality Modeling Guideline, Doc ID AQ-011, rev. 1, December 31, 2002.

Table 5.1 CRITERIA FOR USING DEQ'S GENERIC CONCRETE BATCH PLANT MODELING RESULTS FOR AIR IMPACT ANALYSES

Parameter	DEQ Model				Proposed Project	Comments
No Collocation. Minimum distance from nearest edge of any emissions source to any other source of emissions, including another concrete batch plant, hot mix asphalt plant, or rock crushing plant.	200 meters (656 feet)				Collocated **operations**[b] not proposed.	Meets
Number of cement and/or cement supplement storage silos	Not limited.				One silo	Meets
Maximum daily concrete production (cy/day)	1,500	2,400	3,600	4,800	Max 1,800	Meets
Minimum Setback Distance. Minimum distance from nearest edge of any emissions source to a receptor (meters [m] or feet [ft])[a]	40 m (131 ft)	60 m (197 ft)	100 m (328 ft)	150 m (492 ft)	> 40 meters (131 ft)	Meets
Maximum annual concrete production (cy/year)	300,000	400,000	500,000	500,000	100,000	Meets
Cement and supplement storage silo baghouse(s) Minimum stack height (height above ground) Minimum PM/PM_{10} control	10 meters (32.8 ft) 99%				~36.7 ft, 99.8% *≥ 32.8 ft, ≥ 99%*	Cement silo *Supplement silo*
Weigh hopper loading baghouse, or equivalent Minimum stack height (height above ground) Minimum PM/PM_{10} control	10 meters (32.8 ft) 95%				Enclosure ~ 12 feet Est. 95%	Acceptable/ Meets
Truck-mix loadout. Minimum PM/PM_{10} control.	95% Boot enclosure, shroud, water sprays, or baghouse/cartridge filter				Boot enclosure	Meets
Transfer Point Fugitives. Minimum PM/PM_{10} control.	75% Water sprays, enclosures, shrouds, or aggregate/sand is damp on an as-received basis and used before significantly drying out.				Manual sprays and sprinklers, aggregate washed before delivery.	Meets.

[a] Distance to any structure normally occupied by members of the public (e.g., a residence, school, health care facility), or outdoor public gathering place. This distance shall be measured from the nearest edge of any storage pile, silo, weigh batcher, transfer point, or conveyor associated with this concrete batch plant. This limitation does not apply to the distance to any public road or highway.

[b] Collocation with the permittee's rock crushing plant is allowed only in accordance with Permit Conditions 2.8 and 2.13, which prohibit the plants being operated simultaneously.

5.4 Regulatory Review

This section describes the regulatory analysis of the applicable air quality rules with respect to this PTC.

IDAPA 58.01.01.201..............................Permit to Construct Required

The facility's proposed project does not meet the permit to construct exemption criteria contained in Sections 220 through 223 of the Rules. Therefore, a PTC is required.

IDAPA 58.01.01.203..............................Permit Requirements for New and Modified Stationary Sources

The applicant has shown to the satisfaction of DEQ that the facility will comply with all applicable emissions standards, ambient air quality standards, and toxic increments.

IDAPA 58.01.01.224..............................Permit to Construct Application Fee

The applicant satisfied the PTC application fee requirement by submitting a fee of $1,000.00 at the pre-permit consultation meeting on May 7, 2007.

IDAPA 58.01.01.225...............................Permit to Construct Processing Fee

The total emissions from the proposed facility are less than one ton per year; therefore, the associated processing fee is $1,000.00. No permit to construct can be issued without first paying the required processing fee. The processing fee was received on June 7, 2007.

IDAPA 58.01.01.625...............................Visible Emissions

This rule has been incorporated as a permit condition to require control of particulate emissions from concrete batch plant point sources.

IDAPA 58.01.01.650-651 ....Rules for the Control of Fugitive Dust

This rule has been incorporated as a permit condition to require reasonable control of fugitive dust from the concrete batch plant.

40 CFR 60 ....New Source Performance Standards, Subpart OOO, Standards of Performance for Nonmetallic Mineral Processing Plants

The provisions of this subpart do not apply to stand-alone screening operations at plants without crushers or grinding mills. The facility is therefore not subject to NSPS.

5.5 Permit Conditions Review

This section describes only those permit conditions that have been added as a result of this permit action, and that may not be self-explanatory.

5.5.1 Permit Conditions 1.3 and 2.2 describe the emissions controls that shall be operated as part of this concrete batch plant. The plant configuration currently does not include using flyash. The emissions and modeling analysis were based on including emissions from a cement supplement silo. Additional cement and/or cement supplement silos may be added to this facility provided that each silo and its associated baghouse or cartridge filter complies with the minimum requirements shown in Table 2.1 of the permit. Demonstration of compliance with NAAQS and TAPs rules was based on emissions estimated using the capture efficiencies associated with these controls. Applicability of DEQ's generic modeling analysis was also determined based on the descriptions of these controls provided in the application.

5.5.2 Permit Condition 2.4 limits the concrete production to 100,000 cubic yards in any consecutive 12-month period. The production rate requested in the application was 10,000 cubic yards per year, but the applicant also requested during the pre-application meeting that DEQ increase this level as appropriate based on the results of the DEQ-developed emissions inventory and generic modeling. Compliance with carcinogenic TAPs requirements was based on the controlled production level of 100,000 cubic yards per year; an annual production limit is therefore required in accordance with IDAPA 58.01.01.210.08.c. Daily concrete production is limited based on the minimum setback distance that is available at a particular site or on any day that the plant is operating. This provides flexibility for the permittee to operate the plant at a higher capacity when it is located in more remote areas or where there is greater separation between the plant operations and members of the public.

5.5.3 Permit Condition 2.4 was imposed to require a reasonable setback from any building that may be normally occupied by members of the public or an outdoor public gathering place. This condition is necessary to limit exposure to members of the public to PM_{10} levels that may approach the 24-hour NAAQS limit.

Modeling of ambient air impacts was based on distances from the approximate center of a typical batch plant facility. The permit condition, however, is based on distance from the nearest edge of any storage pile or piece of equipment associated with the concrete batch plant. This is intended to simplify the method for demonstrating compliance, i.e., compliance can be demonstrated by directly measuring the distance.

The setback does not apply to the distance to a public road or highway because it is not reasonable that any member of the public would remain on the roadway throughout the day. The setback distance, however, does apply to the distance to any structure or outdoor public gathering place located across the roadway.

5.5.4 Permit Condition 2.9 requires the permittee to physically measure the minimum setback distance to within plus or minus 1.8 meters (6 feet). This provides reasonable flexibility for the methods that the permittee can select to measure the setback distance, but should not be construed to mean that the minimum setback distances specified in Permit Condition 2.4 can be reduced by 1.8 meters (6 feet).

5.5.5 Permit Condition 2.12 prohibits operation in any PM_{10} nonattainment area. IDAPA 58.01.01.006 defines a "significant contribution" as any increase in ambient concentrations that would exceed 5.0 $\mu g/m^3$ (24-hr average) or 1.0 $\mu g/m^3$ (annual average). The generic modeling analysis used to demonstrate preconstruction compliance with NAAQS for this facility predicted that PM_{10} impacts to ambient air quality would exceed these levels. In any nonattainment area, facility operations would therefore result in a significant contribution to a violation of the PM_{10} air quality standard.

5.5.6 The permittee also operates a portable rock crusher, Facility ID 777-00416, under a permit by rule registration. During the pre-application meeting, DEQ agreed to evaluate the acceptability of siting the crusher closer than 200 meters from the Mackay Plant, if a specific permit condition were imposed that the rock crusher and the concrete batch plant could not be operated simultaneously. Permit Condition 2.13 authorizes this practice. Compliance is demonstrated by Permit Condition 2.8.2, which requires documenting the times of operation of the batch plant and the rock crusher any time that distance between nearest source associated with each of the facilities is less than 200 meters. For days when one of the plants is not operated at all, a notation in the log that that plant was not operated that day is sufficient. Daily recordkeeping is not required on days when neither of the two plants is operated. Permit Condition 2.13 prohibits collocated operations of the Mackay Plant with any source except for their portable rock crushing facility.

6. PERMIT FEES

An application fee of $1,000 is required in accordance with IDAPA 58.01.01.224. The application fee was received by DEQ on February 9, 2007. A permit processing fee of $1,000 is required in accordance with IDAPA 58.01.01.225, because the permit required engineering analysis and the increase in emissions from point sources is less than one ton per year. The processing fee was received on June 7, 2007. This facility is not a major facility and is not subject to Tier I registration fees.

Table 6.1 PTC PROCESSING FEE TABLE

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
NO_X	0.0	0	0.0
SO_2	0.0	0	0.0
CO	0.0	0	0.0
PM_{10}	2.30E-02	0	2.30E-02
VOC	0.0	0	0.0
HAPS	1.09E-04	0	1.09E-04
Total:	**2.31E-02**	0	**2.31E-02**
Fee Due	**$ 1,000.00**		

7. PERMIT REVIEW

7.1 Regional Review of Draft Permit

On May 10, 2007, an electronic copy of the draft permit and statement of basis was sent to the Idaho Falls Regional Office. Minor comments were received on May 11.

7.2 Facility Review of Draft Permit

On May 29, 2007, an electronic copy of the draft permit and statement of basis was sent to the facility. Minor comments and questions were received from the facility by telephone on June 8, 2007.

7.3 Public Comment

The facility held the required public information meeting in Salmon on May 21, 2007. An opportunity for public comment period on the PTC application was provided from May 25, 2007, through June 8, 2007, in accordance with IDAPA 58.01.01.209.01.c. During this time, there were comments on the application and a member of the public requested a public comment period on DEQ's proposed action.

A 30-day public comment period will be conducted in accordance with IDAPA 58.01.01.209.01.c

8. RECOMMENDATION

Based on review of application materials, and all applicable state and federal rules and regulations, staff recommend that Doloughan Construction, LLC dba Lost River Ready Mix be issued proposed PTC No. P-2007.0078 for this portable concrete batch plant. A public comment period has been requested, and the project does not involve PSD requirements.

CAR/xx Permit No. P-2007.0078

Appendix A

AIRS Information

P-2007.0078

AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

Facility Name: Doloughan Construction, LLC dba Lost River Ready Mix
Facility Location: Portable
AIRS Number: 777-00415

AIR PROGRAM POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	SM80	TITLE V	AREA CLASSIFICATION A-Attainment U-Unclassified N- Nonattainment
SO_2	---							
NO_x	---							
CO	---							
PM_{10}	B							U
PT (Particulate)	B							U
VOC	---							
THAP (Total HAPs)	B							U
			APPLICABLE SUBPART					

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

- A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAPs only, class "A" is applied to each pollutant which is at or above the 10 T/yr threshold, **or** each pollutant that is below the 10 T/yr threshold, but contributes to a plant total in excess of 25 T/yr of all HAPs.
- SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.
- B = Actual and potential emissions below all applicable major source thresholds.
- C = Class is unknown.
- ND = Major source thresholds are not defined (e.g., radionuclides).

Appendix B

Emissions Inventory

P-2007.0078

CRITERIA POLLUTANT EMISSION INVENTORY for Truck Mix Portable Concrete Batch Plant

Facility Information 5/10/07 15:17

Company:	Doloughan Construction, LLC dba Lost River Ready Mix	**Assumptions Implied or Stated in Application:**
Facility ID:	777-00415	Initial permit for this plant
Permit No.:	P-2007.0078	See control assumptions
Source Type:	(Truck Mix) Portable Concrete Batch Plant	
Manufacturer:	Mackay Plant	

INCREASE IN Production[1]

Maximum Hourly Production Rate:	75	cy/hr		
Proposed Daily Production Rate:	1,800	cy/day	24.00	Hours of operation per day at max capacity
Proposed Maximum Annual Production Rate:	100,000	cy/year		
				DEQ EI VERIFICATION WORKSHEET 032007 Revisions
Cement Storage Silo Capacity:		ft^3 of aerated cement		**Tip:** Purple text or numbers are meant to be changed.
Cement Storage Silo Large Compartment Capacity for cement only:		of the silo capacity		Black text or numbers indicates it's hard-wired or calculated.
Cement Storage Silo small Compartment Capacity for cement or ash:		of the silo capacity		Review these before you change them.

Change in PM_{10} Emissions due to this PTC

Emissions Point	PM_{10} Emission Factor[1] (lb/cy)		Controlled Emission Rate, Max.	Controlled Emission Rate, 24-hour average		Controlled Emission Rate, annual average			
	Controlled	Uncontrolled	lb/hr [2]	lb/hr[3]	lb/day[3]	lb/hr[4]	T/yr[4]	**Control Assumptions:**	
Aggregate delivery to ground storage		0.0030	0.06	0.06	1.37	0.01	0.04	75%	Control: Manual spray hoses or spray bars
Sand delivery to ground storage		0.0007	0.01	0.01	0.32	0.00	0.01	75%	Control: Manual spray hoses or spray bars
Aggregate transfer to conveyor		0.0030	0.06	0.06	1.37	0.01	0.04	75%	Control: Manual spray hoses or spray bars
Sand transfer to conveyor		0.0007	0.01	0.01	0.32	0.00	0.01	75%	Control: Manual spray hoses or spray bars
Aggregate transfer to elevated storage		0.0030	0.06	0.06	1.37	0.01	0.04	75%	Control: Manual spray hoses or spray bars
Sand transfer to elevated storage		0.0007	0.01	0.01	0.32	0.00	0.01	75%	Control: Manual spray hoses or spray bars
Cement delivery to Silo (controlled EF)	**0.0001**		6.26E-03	**6.26E-03**	1.50E-01	9.53E-04	**4.17E-03**	**0.00%**	Baghouse is process equipment
Cement supplement delivery to Silo (controlled EF)	**0.0002**		1.34E-02	**1.34E-02**	3.22E-01	2.04E-03	**8.94E-03**	**0.00%**	Baghouse is process equipment
Weight hopper loading (sand & aggregate batcher loading)		**0.0040**	1.48E-02	**1.48E-02**	3.56E-01	2.26E-03	**9.88E-03**	95.00%	Partially enclosed transfer, sand & aggregate are damp. Treat as point source "vent"
Truck mix loading,Table 11.12-2		0.0784	0.29	0.29	7.06	0.04	0.20	95%	Control: Automatic rubber boot or equivalent
Point Sources Total Emissions		**4.21E-03**	**3.45E-02**	**3.45E-02**	8.28E-01	**5.25E-03**	**2.30E-02**		
Process Fugitive Emissions		0.0897	0.51	0.51	12.12	0.08	0.34		
Facility Wide Total: Point Sources + Process Fugitives (Except for Road Dust and Windblown Dust)		0.0939	0.54	0.54	12.95	0.08	0.36		

POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION[6] Controlled EF at 657,000 cy/yr

			T/yr
Facility Classification Total PM[5]		**5.40E-03**	**1.77**
Facility Classification Total PM10[5]		**4.60E-04**	**0.15**

[1] The EFs were calculated using EFs in lb/ton of material handled from Table 11.12-2, typical composition per cubic yard of concrete (1865 lb aggregate, 1428 lbs sand, 491 lbs cement, 73 lbs cement supplement, and 20 gallons of water = 4024 lb/cy), and closely match Table 11.12-5 values (version 6/06) when rounded to the same number of figures. AP-42 lists the same EFs for uncontrolled and controlled emissions, so control estimates are based on the assumed control levels input on the right hand side of the table.

[2] Max. hourly rate includes reductions associated with control assumptions.

[3] Hourly emissions rate (24-hr average) = Max.hourly emissions rate x (hrs per day) / 24.
Daily emissions rate = max emissions rate (1-hr average) x proposed hrs/day.

[4] Annual average hourly emissions rate = EF (lb/cy) x proposed annual production rate (cy/yr) / (8760 hr/yr).
Annual emissions rate = EF (lb/cy) x proposed annual production rate (cy/yr) /(2000 lb/T)

[5] Controlled EFs for PM = 0.0002 (cement silo)*(1-controlCS) + 0.0003 (flyash silo)*(1-controlCSS) +0.0079(weigh batcher)*(1-controlWB)
for PM10 = 0.0001 (cement silo)*(1-controlCS) + 0.0002 (flyash silo)*(1-control CSS) +0.0040 (weigh batcher)*(1-controlWB)

[6] Emissions for Facility Classification are based on baghouses as process equipment, 24-hr day, 8760 hr/yr = 1,800 cy/day, and 657,000 cy/yr

Lead emissions			Increase in Emissions from this PTC				Emissions for Facility Classification	
Emissions Point	Lead Emission Factor[1] (lb/ton of material loaded)		Emission Rate, Max.	Emissions for Comparison with DEQ Modeling Threshold		Emission Rate, Quarterly		
	Controlled with fabric	Uncontrolled	lb/hr, 1-hr avg.[2]	lb/month[3]	T/yr[4]	lb/hr qtrly avg[5]		T/yr
Cement delivery to silo [2]	**1.09E-08**	7.36E-07	2.01E-07	1.47E-04	2.68E-04	2.01E-07	Point Source	8.79E-07
Cement supplement delivery to Silo [3]	**5.20E-07**	ND	1.42E-06	1.04E-03	1.90E-03	1.42E-06	Point Source	6.23E-06
Truck Loadout (with S36% control)		**3.62E-06**	3.83E-06	2.79E-03	5.10E-03	3.83E-06	Fugitive	
Total			**5.45E-06**	**3.98E-03**	**0.007**		**Point Sources**	**7.11E-06**
DEQ Modeling Threshold				100	0.6			
Modeling Required?				No	No			

[1] The emissions factors are from AP-42, Table 11.12-8 (version 06/06)
[2] Max. hourly rate = EF x pound of cement/yd^3 of concrete x max. hourly concrete production rate/(2000 lb/T)
[3] lb/mo = EF x pound of material/yd^3 of concrete x max. daily concrete production rate x (365/12)/(2000 lb/T)
[4] T/yr = EF x pound of material/yd^3 of concrete x max. annual concrete production rate/(2000 lb/T)
[5] lb/hr, qtrly avg = lb/mo x 3 months per qtr / (8760/4)hrs per qtr

Toxic Air Pollutant (TAPs) EMISSIONS INVENTORY, Truck Mix Concrete Batch Plant

5/10/2007 15:17

Facility Information

Company:	Doloughan Construction, LLC dba Lost River Ready Mix
Facility ID:	777-00415
Permit No.:	P-2007.0078
Source Type:	(Truck Mix) Portable Concrete Batch Plant
Manufacturer:	Mackay Plant

Emissions estimates are based on EFs in AP-42, Table 11.12-8 (version 06/06) and the following composition of one yard of concrete:

Coarse aggregate	1865 pounds
Sand	1428 pounds
Cement	491 pounds
Cement supplement	73 pounds
Water	20 gallons
Concrete	4024 pounds

Increase in Production

Maximum Hourly Production Rate:	75	cy/hr
Proposed Daily Production Rate:	1,800	cy/day
Proposed Maximum Annual Production Rate:	100,000	cy/year

Uncontrolled (Unlimited Production Rate)

	24 hrs/day,
1,800 cy/day	7 day/wk,
657,000 cy/year	52 wks/year

DEQ EI VERIFICATION WORKSHEET 032007 Revisions
Tip: Purple text or numbers are meant to be changed.
Black text or numbers indicates it's hard-wired or calculated.
Review these before you change them.

TAP Emission Factors from AP-42, Table 11.12-8 (Version 06/06)

Emissions Point	Arsenic EF (lb/ton of material loaded)		Beryllium EF (lb/ton of material loaded)		Cadmium EF (lb/ton of material loaded)		Chromium EF (lb/ton of material loaded)		Manganese EF (lb/ton of material loaded)		Nickel EF (lb/ton of material loaded)		Phosphorus EF (lb/ton of material loaded)		Selenium EF (lb/ton of material loaded)		Chromium VI
	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Percent of total Cr that is Cr+6
Cement delivery to silo (with baghouse)	4.24E-09	[illegible]	4.86E-10	[illegible]	4.86E-10	[illegible]	2.90E-08	[illegible]	1.17E-07	[illegible]	4.18E-08	[illegible]	ND	1.18E-05	ND	ND	20%
Cement supplement delivery to Silo (with baghouse)	1.00E-06	ND	9.04E-08	ND	1.98E-08	ND	1.22E-06	ND	2.56E-07	ND	2.28E-06	ND	3.54E-06	ND	7.24E-08	ND	30%
Truck Loadout (no boot or shroud)	[illegible]	3.04E-06	[illegible]	2.44E-07	[illegible]	3.42E-08	[illegible]	1.14E-05	[illegible]	6.12E-05	[illegible]	1.19E-05	[illegible]	3.84E-05	[illegible]	2.62E-06	21.29%

UNCONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment. 1,800 cy/day, and 657,000 cy/yr

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg.	T/yr[4]	lb/hr annual avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr[5]	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.
Cement delivery to silo (with baghouse)	7.81E-08	3.42E-07	8.95E-09	3.92E-08	8.95E-09	3.92E-08	5.34E-07	2.03E-05	2.15E-06	9.44E-06	7.70E-07	3.37E-06	2.17E-04	9.52E-04	ND	ND	1.07E-07
Cement supplement delivery to Silo (with baghouse)	2.74E-06	1.20E-05	2.47E-07	1.08E-06	5.42E-08	2.37E-07	3.34E-06	1.46E-05	7.01E-07	3.07E-06	6.24E-06	2.73E-05	9.69E-06	4.24E-05	1.98E-07	8.68E-07	1.00E-06
Truck Loadout (NO boot or shroud)	6.43E-05	2.82E-04	5.16E-06	2.26E-05	7.23E-07	3.17E-06	2.41E-04	1.06E-03	1.29E-03	5.67E-03	2.52E-04	1.10E-03	8.12E-04	3.56E-03	5.54E-05	2.43E-04	5.13E-05
Point Sources Total	**6.71E-05**	2.94E-04	**5.42E-06**	2.37E-05	**7.86E-07**	3.44E-06	**2.45E-04**	1.09E-03	**1.30E-03**	5.68E-03	**2.59E-04**	1.13E-03	**1.04E-03**	4.55E-03	**5.56E-05**	2.44E-04	**5.25E-05**
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07
EXCEEDS EL?	**Yes**		No		No		No		No		**Yes**		No		No		**Yes**

Facility Classification: Total Annual HAPs Emissions
1.30E-02 Tons per year

CONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment. 1,800 cy/day, and 100,000 cy/year

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg.	T/yr[4]	lb/hr annual avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr[5]	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr 24-hr avg.	T/yr	lb/hr annual avg.
Cement delivery to silo (with baghouse)[1]	1.19E-08	5.20E-08	1.36E-09	5.97E-09	1.36E-09	5.97E-09	5.34E-07	3.56E-07	2.15E-06	1.44E-06	1.17E-07	5.13E-07	ND	ND	ND	ND	1.63E-08
Cement supplement delivery to Silo (with baghouse)2	4.17E-07	1.83E-06	3.77E-08	1.65E-07	8.25E-09	3.61E-08	2.25E-05	2.23E-06	4.71E-06	4.67E-07	9.50E-07	4.16E-06	6.52E-05	6.46E-06	1.98E-07	1.32E-07	1.53E-07
Truck Loadout (WITH boot or shroud)	4.89E-07	2.14E-06	3.93E-08	1.72E-07	5.50E-09	2.41E-08	1.21E-05	8.04E-06	6.47E-05	4.31E-05	1.92E-06	8.39E-06	4.06E-05	2.71E-05	2.77E-06	1.85E-06	3.91E-07
Point Sources Total	**9.18E-07**	4.02E-06	**7.83E-08**	3.43E-07	**1.51E-08**	6.62E-08	**3.51E-05**	1.06E-05	**7.16E-05**	4.50E-05	**2.98E-06**	1.31E-05	**1.06E-04**	3.35E-05	**2.97E-06**	1.98E-06	**5.59E-07**
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07
Percent of EL	61.19%		0.28%		0.41%		0.11%		0.0215%		11.05%		1.51%		0.0228%		99.91%
EXCEEDS EL?	**No**		No		No		No		No		No		No		No		**No**

95% Control. Automatic rubber boot or equivalent.
1.09E-04 Tons per year

[1] lb/hr, annual average = EF x pound of cement / Yd[3] of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr = EF x pound of cement / Yd3 of concrete x daily concrete production rate / 2000lb/Ton / 24 hr/day

[2] lb/hr, annual average = EF x pound of cement supplement / Yd[3] of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of cement supplement / Yd3 of concrete x daily concrete production rate / 2000lb/Ton

[3] lb/hr, annual average = EF x pound of (cement + cement supplement) / Yd[3] of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of (cement + cement supplement) / Yd3 of concrete x daily concrete production

[4] T/yr = lb/hr, annual avg x 8760 hr/yr x (1T/2000 lb)

[5] T/yr = EF x pound of cement, or cement supplement, or cement + cement supplement x annual concrete production rate /2000 lb/ton / 2000 lb/ton

Appendix C

Modeling Review

P-2007.0078

MEMORANDUM

DATE: March 23, 2007

Prepared by: Cheryl Robinson, P.E., Staff Engineer/Permit Writer, Air Quality Division

Reviewed by: Kevin Schilling, Modeling Coordinator, Air Quality Division

SUBJECT: Portable Concrete Batch Plants – Generic Modeling Results for Typical Plant

1. Summary

Most ready-mix concrete batch plants share many characteristics with each other such as equipment design, fugitive dust control practices, emissions quantities for a given processing rate, general facility layout, and emission release parameters. These shared characteristics allow the development of generic methods to assess the air quality impact of these batch plants. The appropriateness of using generic methods is particularly justifiable for ready-mix concrete batch plants because most are permitted as portable sources, and specific equipment configurations will change somewhat from site to site.

1.1 Generic Modeling Applicability

Use of this generic method to demonstrate preconstruction compliance with National Ambient Air Quality Standards (NAAQS) and Idaho toxic air pollutant (TAP) rules from operation of concrete batch plants is designed to generate reasonably conservative results, and may not be applicable to all batch plants.

The key criteria for determining the applicability of the generic modeling results are summarized in Table 1. In cases where the proposed operations differ from these assumptions (e.g., stack heights are lower, or emissions controls do not meet the minimum criteria), the applicant shall provide additional explanation in their modeling protocol to justify use of the generic modeling results. This information, along with DEQ's approval of the modeling protocol shall be included in the statement of basis for the permit.

The appropriateness of this method to specific conditions will be made on a case-by-case basis considering the following:

- Equipment used at the batch plant, especially considering the type and effectiveness of emissions control equipment and practices.
- Proposed location for the facility, considering the presence of any sensitive receptors near the property boundary and the distance from pollutant emitting equipment to the property boundary.
- The presence of other pollutant emitting activities occurring at the site, including collocation with another concrete batch plant, rock crushing equipment and/or hot mix asphalt plants.

Table 1. CRITERIA FOR USING DEQ's CONCRETE BATCH PLANT GENERIC MODELING RESULTS FOR AIR IMPACT ANALYSES

Parameter	DEQ Generic Modeling Assumptions
Concrete batch plant type and capacity	Truck mix (redi-mix or dry mix) or Central mix Maximum 300 cy per hour capacity
Operation in any PM_{10} nonattainment area	Not proposed.

Table 1. CRITERIA FOR USING DEQ's CONCRETE BATCH PLANT GENERIC MODELING RESULTS FOR AIR IMPACT ANALYSES

Parameter	DEQ Generic Modeling Assumptions			
Presence of an electric generator.	No generator. Line power is available.			
No Collocation. Minimum distance from nearest edge of any emissions source to any other source of emissions, including another concrete batch plant, hot mix asphalt plant, or rock crushing plant.	200 meters (656 feet)			
Number of cement and/or cement supplement storage silos	Not limited. The model layout assumes all silo emissions are from the same point, and that cement/supplement is not transferred between storage silos.			
Maximum daily concrete production (cy/day)	1,500	2,400	3,600	4,800
Minimum Setback Distance. Minimum distance from nearest edge of any emissions source to a receptor.[a]	**40 m (131 ft)**	**60 m (197 ft)**	**100 m (328 ft)**	**150 m (492 ft)**
Maximum annual concrete production (cy/year)	300,000	400,000	500,000	500,000
Cement and supplement storage silo baghouse(s) Minimum stack height (height above ground) Minimum PM/PM_{10} control	10 meters (32.8 ft) 99%			
Weigh hopper loading baghouse, or equivalent Minimum stack height (height above ground) Minimum PM/PM_{10} control	10 meters (32.8 ft) 99%			
Truck-mix loadout or Central Mix loading. Minimum PM/PM_{10} control.	95% Boot enclosure, shroud, water sprays, or baghouse/cartridge filter			
Transfer Point Fugitives. Minimum PM/PM_{10} control.	75% Water sprays, enclosures, shrouds, or aggregate/sand is damp on an as-received basis and used before significantly drying out.			

[a] Distance to any structure normally occupied by members of the public (e.g., a residence, school, health care facility), or outdoor public gathering place. This distance shall be measured from the nearest edge of any storage pile, silo, weigh batcher, transfer point, or conveyor associated with this concrete batch plant. This limitation does not apply to the distance to any public road or highway.

1.2 Applicable Permit Conditions

The following permit conditions should be included in any permit using the generic modeling to demonstrate preconstruction compliance with NAAQS and TAPs:

- A prohibition on operating this plant in any PM_{10} nonattainment area. IDAPA 58.01.01.006 defines a PM_{10} impact increase of 5 μg/m3 (24-hour average) or 1 μg/m3 (annual average) as a "significant contribution." The predicted ambient impacts for each of the modeled daily and annual production rates exceed these thresholds.
- Daily concrete production limits based on the setback distance available that day. The setback for each modeled daily production rate is defined by the minimum distance needed to meet the 24-hour PM_{10} NAAQS standard.
- Annual concrete production limits based on the setback distance available at any location. Preconstruction compliance with state TAPs rules was demonstrated using controlled TAPs emissions, so per IDAPA 58.01.01.210.08, an emission limit must be imposed. The production limit inherently limits the TAPs emissions, so a pollutant-specific lb/yr limit is not needed.

2

- O & M manual and operational requirements that will ensure that a high level of control is consistently achieved and maintained for baghouse/cartridge filters and for control of fugitive emissions from material transfer points.

2. Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 Area Classification

The concrete batch plant is a portable facility that may operate in any attainment or unclassifiable area anywhere in the State of Idaho.

2.1.2 Significant and Full Impact Analyses

If estimated maximum criteria pollutant impacts to ambient air from the emissions sources at this facility exceed the significant contribution levels (SCLs) of IDAPA 58.01.01.006, then a full impact analysis is necessary to demonstrate compliance with IDAPA 58.01.01.203.02. A full impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the National Ambient Air Quality Standards (NAAQS) listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS.

The generic modeling does not currently include emissions from any generators (line power is required to be available), so PM10 and lead are the only criteria pollutants emitted by this facility.

Table 2. CRITERIA AIR POLLUTANTS APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Contribution Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual	1.0	50[f]	Maximum 1st highest[g]
	24-hour	5.0	150[h]	Maximum 6th highest[i]
Carbon Monoxide (CO)	8-hour	500	10,000[j]	Maximum 2nd highest[g]
	1-hour	2,000	40,000[j]	Maximum 2nd highest[g]
Sulfur Dioxide (SO_2)	Annual	1.0	80[f]	Maximum 1st highest[g]
	24-hour	5	365[j]	Maximum 2nd highest[g]
	3-hour	25	1,300[j]	Maximum 2nd highest[g]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[f]	Maximum 1st highest[g]
Lead	Quarterly	NA	1.5[h]	Maximum 1st highest[g]

[a] IDAPA 58.01.01.006
[b] Micrograms per cubic meter
[c] IDAPA 58.01.01.577 for criteria pollutants
[d] The maximum 1st highest modeled value is always used for significant impact analysis
[e] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[f] Never expected to be exceeded in any calendar year
[g] Concentration at any modeled receptor
[h] Never expected to be exceeded more than once in any calendar year
[i] Concentration at any modeled receptor when using five years of meteorological data
[j] Not to be exceeded more than once per year

2.1.3 Toxic Air Pollutant Analyses

Toxic Air Pollutant (TAP) requirements for PTCs are specified in IDAPA 58.01.01.210. If the increase associated with a new source or modification exceeds screening emission levels (ELs) contained in IDAPA 58.01.01.585 or 586, then the ambient impact of the emissions increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens listed in IDAPA 58.01.01.585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) listed in IDAPA 58.01.01.586, then compliance with TAP requirements has been demonstrated.

2.2 Background Concentrations

Ambient background concentrations were revised for all areas of Idaho by DEQ in March 2003[1]. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. Background concentrations used in these analyses are listed in Table 3. These are the default rural/agricultural background concentrations, which were used because concrete batch plants are typically located outside of urban areas.

Table 3. BACKGROUND CONCENTRATIONS

Pollutant	Averaging Period	Background Concentration (μg/m3)[a]
PM_{10}[b]	24-hour	73
	annual	26
Carbon monoxide (CO)	1-hour	3,600
	8-hour	2,300
Sulfur dioxide (SO2)	3-hour	34
	24-hour	26
	Annual	8
Nitrogen dioxide (NO2)	Annual	17

a. Micrograms per cubic meter
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

3. Modeling Impact Assessment

3.1 Modeling Methodology

3.1.1 Model Selection and Key Parameters

Atmospheric dispersion modeling was used to evaluate the air quality impacts from point sources and process fugitive sources. Table 4 provides a summary of the model selection and modeling parameters used in the modeling analyses.

Table 4. MODELING PARAMETERS

Parameter	Description/ Values	Documentation/Additional Description
Model	AERMOD, Version 04300	The Gaussian dispersion model AMS/EPA Regulatory Model (AERMOD) was run for a single case (3,600 cy/day, 500,000 cy/year, with a 100-meter ambient air boundary). This case was used to demonstrate that ambient impacts predicted using AERMOD are lower than impacts predicted using ISCST3 for the same emission points and parameters. This is consistent with results reported by the EPA, which found that AERMOD typically predicted lower concentrations than ISCST3 for rural, low-level stacks; and short term urban, low-level stacks.[2]

[1] Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

[2] U.S. EPA, Comparison of Regulatory Design Concentrations, AERMOD vs. ISCST3, CTDMPLUS, ISC-PRIME, Staff Report, EPA-454/R-03-002, June 2003 (see page 29).

Table 4. MODELING PARAMETERS		
Parameter	**Description/ Values**	**Documentation/Additional Description**
Model	ISCST3, Version 02035	Due to DEQ schedule and resource constraints, and because ISCST3 results are generally higher (conservative) than AERMOD for these types of near-field analyses, DEQ determined that the Industrial Source Complex Short Term (ISCST3), air dispersion model was acceptable at this time for predicting ambient impacts for all cases.
Meteorolog-ical data	Surface Data & Upper Air Data Boise, Idaho 1988-1992 (AERMOD) 1987-1991 (ISCST3)	Previous DEQ analyses showed that using Boise meteorological data generated the highest modeled values at typical concrete batch plant "fenceline" distances, in part because of the well-defined prevailing wind direction at the Boise monitoring location. For the AERMOD run, AERMET pulled the station anemometer height of 6.1 meters directly from the met data files. For the ISCST3 runs, the station anemometer height of 6.1 meters was used.
Land Use (urban or rural)	Rural	Urban area surface heating was not used in this analysis based on typical land use at concrete batch plant locations.
Terrain	Flat/Level	Flat (level) terrain was used because the results must be reasonably applicable to all locations for this portable facility. Maximum impacts from near ground-level emissions sources, such as those at typical concrete batch plants, are very near the emissions source. This assumption was deemed to be appropriate and is not a substantial limitation of this method.
Building downwash	Considered	To account for plume downwash effects from any buildings present, or equipment that may cause downwash, a 20-meter square building, 10 meters tall and positioned at the center of the plant layout, was used as a representation of structures associated with this concrete batch plant. For ISCST3, the building profile input program (BPIP) was used. The PRIME algorithm was not used because building cavity effects are not expected to be significant.
Receptor grid	Grid 1	10-meter spacing along a"fenceline" described by a circle with a radius of 40, 60, 100, or 150 meters.
	Grid 2	25-meter spacing for distances between the "fenceline" and 200 meters.
	Grid 3	50 meter spacing for distances between 200 meters and 500 meters.

3.1.2 Facility Layout and Ambient Air Boundary ("Fenceline")

Portable concrete batch plants are somewhat unique compared to other stationary sources in that the equipment layout may change at each new location. Because of this, a generic approach that reflects a typical batch plant layout is appropriate. The layout used for the modeling is shown in Figure 3-1.

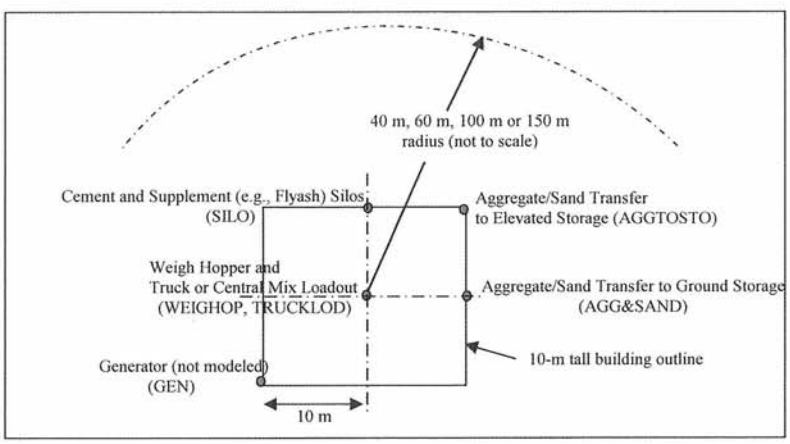

Figure 3-1. TYPICAL CONCRETE BATCH PLANT MODELING LAYOUT

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Correction: The fenceline distances modeled were 40, 60, 100, and 150 meters.

For the generic modeling, the ambient air boundary or "fenceline" was taken to be along the perimeter of a circle with a radius of 100 meters, 75 meters, or 50 meters from the center of a 20 meter by 20 meter "typical" plant layout shown in Figure 3-1. The boundaries of the 10-meter tall building added to the model to account for plume downwash effects are also defined by this 20 meter by 20 meter square.

3.1.3 Emissions Release Parameters

Emissions from the handling of aggregate/sand and tuck loading were each modeled as volume sources. Table 5 provides parameters used for modeling these sources as well as point source parameters.

Emissions from the handling of aggregate and sand to ground storage and from ground storage to a ground-level conveyor were modeled together as a volume source in a 20-meter square area at the center of the plant. A 2-meter release height was used to represent the average transfer height. Emissions from conveyor transfer to elevated storage were modeled as an elevated volume source on the 20-meter square building, using a 5-meter release height.

Standard modeling guidance for volume sources on or adjacent to structures suggests setting initial dispersion coefficients as follows:

$$\sigma_{y0} = \text{horizontal dimension} / 4.3$$
$$\sigma_{z0} = \text{vertical dimension} / 2.15$$

Miscellaneous ground-level aggregate and sand handling was assumed to occur from activities in a 20-meter square area. Standard modeling guidance for volume sources not on or adjacent to structures suggests setting initial dispersion coefficients as follows:

$$\sigma_{y0} = \text{horizontal dimension} / 4.3$$
$$\sigma_{z0} = \text{vertical dimension} / 4.3$$

Point sources were conservatively modeled in the generic analyses assuming a horizontal release or a rain-capped stack. A stack gas exit velocity of 0.001 meters per second was used to eliminate momentum-induced plume rise, which would only occur from an uninterrupted vertical release.

Table 5. EMISSIONS RELEASE PARAMETERS FOR SOURCES

Point Sources						
Source	**UTM Coord. (m)**		**Stack Height (m)[a]**	**Stack Gas Temp. (K)[b]**	**Stack Dia. (m)**	**Flow Rate (m/sec)[c]**
	Easting	**Northing**				
Silo baghouse(s) stack	0	10	10	0, 298.15[d]	1.0	0.001[e]
Weigh hopper baghouse stack	0	0	10	0, 298.15[d]	1.0	0.001[e]
Volume Sources						
Source	**UTM Coord. (m)**		**Release Height (m)**	**Initial Horizontal Coefficient σ_{y0} (m)**	**Initial Vertical Coefficient σ_{z0} (m)**	
	Easting	**Northing**				
Aggregate/sand transfers at ground level	10	10	2	4.65	0.70	
Aggregate/sand transfers at elevated level	10	0	5	4.65	4.65	
Truck loading	0	0	5	4.65	4.65	

a. Meters

b. Kelvin

c. Meters per second

d. When a value of 0 K is used, the AERMOD model uses the ambient air temperature. This value was set to 77 degrees Fahrenheit (298.15 K) for the ISCST3 runs. This is not expected to result in a measurable difference in the ambient impact results.

e. Set to 0.001 m/sec for a horizontal release or release from a rain-capped vertical stack.

3.1.4 Wind Speed Adjustments for Fugitive Emissions

The dispersion model AERMOD has an option by which emissions can be varied as a function of wind speed. There are six wind speed categories, and adjustment factors can be assigned for each category. Emissions for each hour modeled are calculated by multiplying the base rate by the appropriate adjustment factor, as determined by the wind speed specified for the hour within the meteorological data file.

For the AERMOD run, base emissions rates were calculated using a wind speed of 10 miles per hour. Wind speed adjustment factors were then developed for each of the six wind speed categories corresponding to the default wind speed categories within the model. The mean wind speed of each category was calculated, and emissions associated with that mean wind speed were calculated. An adjustment factor was calculated for each wind speed category by dividing the emissions rate for that category by the base emissions rate calculated at a 10 mile per hour wind speed. Table 6 summarizes the wind speed categories and the calculated adjustment factors.

Table 6. WIND SPEED ADJUSTMENT FACTORS FOR MATERIAL HANDLING EMISSIONS

Wind Speed Category	ISCST3 Default Upper Wind Speed for Category (m/sec[a])	Median Wind Speed for Category (m/sec (mph[b]))	Emissions Rate for Category (lb/ton[c])	Adjustment Factor[d]
1	1.54	0.77 (1.72)	3.32E-4	0.101
2	3.09	2.32 (5.18)	1.39E-3	0.425
3	5.14	4.12(9.20)	2.94E-3	0.897
4	8.23	6.69 (14.95)	5.52E-3	1.69
5	10.8	9.52 (21.28)	8.73E-3	2.67
6	Not Defined	12.4[e] (27.74)	1.23E-2	3.77

[a] Meters per second

[b] Miles per hour

[c] Pounds of emissions per ton of material handled

[d] Calculated by dividing the emissions rate for the category by the emissions rate for a 10 mph wind (3.27E-3 lb/ton)

[e] An upper value wind speed of 14 m/sec was used, based on highest values observed in the meteorological files used in the modeling analyses.

3.2 Emission Rates

The emissions inventories (EIs) used for the generic modeling were based on AP-42 Section 11.12 (dated 06/06) emission factors for a truck-mix concrete batch plant. Based on AP-42 factors, estimated emissions from central mix plants would be the same, except that emissions from loadout to a central mixer are expected to be lower.

Hexavalent chromium [Cr+6 or Cr(VI)] was presumed to comprise 20% of the total chromium emissions from cement silo filling, 30% of the total chromium emissions from cement supplement (e.g., flyash) silo filling, and 21.3% of the total chromium emissions from truck loadout.

Point source emissions from the cement and flyash storage silos were presumed to be controlled by baghouses or cartridge filters with minimum capture efficiencies of 99%.

Uncontrolled fugitive emissions of PM_{10} from material transfer points were based on minimum moisture contents taken from AP-42 Table 11.12-2 of 1.77% for aggregate and 4.17% for sand. Fugitive emissions from material transfer points were assumed to be further controlled by 1) receiving sand and aggregate in a wetted condition and using the stockpile before significant drying out occurs, and/or 2) using manual water sprays or water spray bars to control fugitive emissions that reduce the uncontrolled emissions by an estimated 75%.

Fugitive emissions from truck mix loadout or central mixer loading are controlled by a boot, shroud, or water sprays that reduce the uncontrolled emissions by an estimated 95%.

Fugitive emissions resulting from vehicle traffic and wind erosion from storage piles were excluded from the analysis.

Uncontrolled emissions of TAPs from cement and flyash silo filling and truck mix loadout were based on operation of a 300 cy per hour concrete batch plant for 8,760 hours per year. Cement and flyash silo baghouses/cartridge filters were treated as process equipment, i.e., the uncontrolled TAPs emissions from these sources have been reduced by the capture efficiency associated with the baghouse/cartridge filters.

Emissions were estimated for each of the four daily and annual production combinations (described above in Table 1). The 24-hour and annual average PM_{10} emission rates for each case, and the values used for the modeled source input are summarized in Tables 6A and 6B. The emission rates used for the AERMOD analysis were developed using the equations contained in Section 11.12 of AP-42, rather than using the emission factors from Table 11.12-5, so differ slightly due to rounding or as noted in the table. A sample detailed emissions calculation worksheet is included as Attachment 1 to this memorandum.

Table 6A. EMISSIONS RATES FOR SOURCES - PM_{10}

Source	Emission Factor	Control	ISCST3 1,500 cy/day [b] 300,000 cy/yr [b]		ISCST3 2,400 cy/day 400,000 cy/yr	
	lb/cy [a]		lb/hr_{24} [c]	lb/hr_{YR} [c]	lb/hr_{24}	lb/hr_{YR}
Aggregate to ground	0.0031	75%	0.048	0.027	0.078	0.035
Sand to ground	0.0007	75%	0.011	0.006	0.018	0.008
Aggregate to conveyor	0.0031	75%	0.048	0.027	0.078	0.035
Sand to conveyor	0.0007	75%	0.011	0.006	0.018	0.008
AGG&SAND			**0.119**	**0.065**	**0.190**	**0.086**
Aggregate to elevated storage	0.0031	75%	0.048	0.027	0.078	0.035
Sand to elevated storage	0.0007	75%	0.011	0.006	0.018	0.008
AGGTOSTO			**0.059**	**0.033**	**0.095**	**0.043**
Cement to silo (controlled)	0.0001	--	5.22E-03	2.86E-03	8.35E-03	3.81E-03
Flyash to silo (controlled)	0.0002	--	1.12E-02	6.12E-03	1.79E-02	8.16E-03
SILO			**1.64E-02**	**8.98E-03**	**2.62E-02**	**1.20E-02**
Weigh hopper baghouse stack	0.0040	99%	2.47E-03	1.35E-03	3.95E-03	1.80E-03
WEIGHOP			**2.47E-03**	**1.35E-03**	**3.95E-03**	**1.80E-03**
Truck loadout	0.0784	95%	0.24	0.13	0.39	0.18
TRUCKLOD			**0.24**	**0.13**	**0.39**	**0.18**

[a] Pounds per cubic yard of concrete.

[b] Cubic yards of concrete per day and per year.

[c] Pounds per hour on a 24-hour average and annual average.

Table 6B. EMISSIONS RATES FOR SOURCES - PM_{10}

Source	Emission Factor	Control	AERMOD 3,600 cy/day [b]	ISCST3 3,600 cy/day	ISCST3 4,800 cy/day	AERMOD 500,000 cy/yr [b]	ISCST3 500,000 cy/yr [b]
	lb/cy [a]		lb/hr_{24}	lb/hr_{24} [c]	lb/hr_{24} [c]	lb/hr_{YR}	lb/hr_{YR}
Aggregate to ground	0.0031	75%		0.116	0.155		0.044
Sand to ground	0.0007	75%		0.026	0.035		0.010
Aggregate to conveyor	0.0031	75%		0.116	0.155		0.044
Sand to conveyor	0.0007	75%		0.026	0.035		0.010
AGG&SAND			0.2814	**0.285**	**0.380**	0.1071	**0.109**
Aggregate to elevated storage	0.0031	75%		0.116	0.155		0.044
Sand to elevated storage	0.0007	75%		0.026	0.035		0.010
AGGTOSTO			0.1407	**0.143**	**0.190**	0.0535	**0.054**
Cement to silo (controlled)	0.0001	--		1.25E-02	1.67E-02		4.76E-03
Flyash to silo (controlled)	0.0002	--		2.68E-02	3.58E-02		1.02E-02
SILO			3.939E-02[g]	**3.93E-02**	**5.25E-02**	1.497E-02[g]	**1.50E-02**
Weigh hopper baghouse stack **WEIGHOP**	0.0040	99%	2.964E-02[h]	**5.93E-03**	**7.90E-03**	1.128E-02[h]	**2.26E-03**
Truck loadout **TRUCKLOD**	0.0784	95%	0.588	**0.59**	**0.78**	0.2234	**0.22**

[a] Pounds per cubic yard of concrete.
[b] Cubic yards of concrete per day and per year.
[c] Pounds per hour on a 24-hour average and annual average.

The AERMOD analysis for a 300 cy/hr concrete batch plant demonstrated preconstruction compliance for TAPs using uncontrolled emissions and a 100-meter fenceline radius. The uncontrolled emissions, however, were estimated using an older version of AP-42 Table 11.12-8. Using AP-42 factors from the most recent 06/06 edition, uncontrolled emissions of all TAPs for a 300 cy/hr plant were below the applicable screening emission level except for arsenic, nickel, and hexavalent chromium (see page 2 of the example calculation in Attachment 1. Each of these TAPs is a carcinogen, and is subject to an annual AACC. For the ISCST3 analyses, dispersion modeling was done for the controlled emissions of each of these three TAPs. The controlled TAPs emissions used in the ISCST3 analyses are summarized in Tables 7A and 7B.

Table 7A. EMISSIONS RATES FOR SOURCES – CONTROLLED TAPs EMISSIONS

Modeling Case	ISCST3 300,000 cy/yr			ISCST3 400,000 cy/yr		
Pollutant	**Arsenic**	**Nickel**	**Cr (VI)**	**Arsenic**	**Nickel**	**Cr (VI)**
Source	lb/hr_{YR} [a]	lb/hr_{YR}	lb/hr_{YR}	lb/hr_{YR}	lb/hr_{YR}	lb/hr_{YR}
Cement delivery to silo (with baghouse)	3.56E-08	3.51E-07	4.88E-08	4.75E-08	4.69E-07	6.50E-08
Supplement delivery to silo (with baghouse)	1.25E-06	2.85E-06	4.58E-07	1.67E-06	3.80E-06	6.10E-07
SILO	**1.286E-06**	**3.004E-06**	**5.068E-07**	**1.718E-06**	**4.269E-06**	**6.75E-07**
Truck loadout: Cement and supplement delivery to silo (no controls) **TRUCKLOD**	**1.47E-06**	**5.75E-06**	**1.17E-06**	**1.96E-06**	**7.66E-06**	**1.56E-06**

[a.] Pounds per hour, annual average.

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Table 7B. EMISSIONS RATES FOR SOURCES – CONTROLLED TAPs EMISSIONS						
Modeling Case	ISCST3 500,000 cy/yr			[Reserved]		
Pollutant	Arsenic	Nickel	Cr (VI)	Arsenic	Nickel	Cr (VI)
Source	lb/hr_{YR} [a]	lb/hr_{YR}	lb/hr_{YR}	lb/hr_{YR}	lb/hr_{YR}	lb/hr_{YR}
Cement delivery to silo (with baghouse)	5.94E-08	5.86E-07	8.13E-08			
Supplement delivery to silo (with baghouse)	2.08E-06	4.75E-06	7.63E-07			
SILO	**2.139E-06**	**5.33E-06**	**8.443E-07**			
Truck loadout: Cement and supplement delivery to silo (no controls) **TRUCKLOD**	**2.45E-06**	**9.58E-06**	**1.95E-06**			

a. Pounds per hour, annual average.

3.3 Results for Significant and Full Impact Analyses

A significant contribution analysis was not submitted for this application. Aspen submitted a full impact analysis for the proposed modification project. The results of the facility-wide modeling for criteria pollutants are shown in Table 8.

Table 8. RESULTS OF FULL IMPACT ANALYSES – PM_{10}

Pollutant	Averaging Period	Modeled Design Concentration[a] ($\mu g/m^3$)[b]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact[a] ($\mu g/m^3$)	NAAQS[c] ($\mu g/m^3$)	Percent of NAAQS
ISCST3 Case 1. Low Production:			1,500 cy/day, 300,000 cy/yr, Fenceline at radius of 40 meters			
PM_{10}[d]	24-hour	63.2	73	136.2	150	90.8% (73.2%)[e]
	Annual	11.2	26	37.2	50	74.4%
ISCST3 Case 2. Moderate Production:			2,400 cy/day, 400,000 cy/yr, Fenceline at radius of 60 meters			
PM_{10}[d]	24-hour	79.8	73	152.8	150	102% (82.1%)[e]
	Annual	10.8	26	36.8	50	73.4%
AERMOD Case 3. Moderate Production:			3,600 cy/day, 500,000 cy/yr, Fenceline at radius of 100 meters			
PM_{10}[d]	24-hour	53.3	73	126	150	84.2%
	Annual	5.53	26	31.5	50	63.1%
ISCST3 Case 3. Moderate Production:			**3,600 cy/day, 500,000 cy/yr, Fenceline at radius of 100 meters**			
PM_{10}[d]	24-hour	83.8	73	156.8	150	**104.5% (84.2%)[e]**
	Annual	7.91	26	33.9	50	**67.8%**
ISCST3 Case 4. High Production:			4,800 cy/day, 500,000 cy/yr, Fenceline at radius of 150 meters			
PM_{10}[d]	24-hour	73.8	73	146.8	150	97.9% (78.9%)[e]
	Annual	4.86	26	30.9	50	61.7%

a. Maximum 6th highest value (24-hour standard) for five years of meteorological data.
b. Micrograms per cubic meter
c. National ambient air quality standards
d. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
e. AERMOD results for Case 3 indicate that using the currently approved AERMOD model would result in significantly lower predicted ambient impact than the ISCST3 analysis (about 20% lower, based on Case No.3 results). The estimated ambient impact for this case had AERMOD been run instead of ISCST3 is shown in brackets. This result was deemed acceptable to demonstrate preconstruction compliance with the 24-hr PM_{10} NAAQS standard.

The results of the ISCST3 results for the controlled ambient impact for TAPs emissions are shown in Table 9.

Table 9. RESULTS OF TAPs ANALYSIS - CONTROLLED EMISSIONS				
TAP	**Averaging Period**	**Modeled Design Concentration[a] ($\mu g/m^3$)[b]**	**AACC[c] ($\mu g/m^3$)**	**Percent of AACC**
Case 1	**1,500 cy/day**	**300,000 cy/year**	**40 meters**	
Arsenic	Annual	7.51E-05	2.3E-04	32.7%
Chromium (VI)	Annual	4.54E-05	8.3E-05	54.7%
Nickel	Annual	2.67E-04	4.23E-03	6.4%
Case 2	**2,400 cy/day**	**400,000 cy/year**	**60 meters**	
Arsenic	Annual	8.79E-05	2.3E-04	38.2%
Chromium (VI)	Annual	6.10E-05	8.3E-05	73.5%
Nickel	Annual	3.12E-04	4.23E-03	7.4%
Case 3	**3,600 cy/day**	**500,000 cy/year**	**100 meters**	
Arsenic	Annual	6.78E-05	2.3E-04	29.5%
Chromium (VI)	Annual	4.63E-05	8.3E-05	55.8%
Nickel	Annual	2.38E-04	4.23E-03	5.6%
Case 4	**4,800 cy/day**	**500,000 cy/year**	**150 meters**	
Arsenic	Annual	4.38E-05	2.3E-04	39.1%
Nickel	Annual	2.98E-05	8.3E-05	35.9%
Chromium (VI)	Annual	1.53E-04	4.23E-03	3.6%

[a] Maximum 1st highest value for five years of meteorological data.
[b] Micrograms per cubic meter
[c] Acceptable ambient concentration for carcinogens

4.0 Conclusions

The ambient air impact analysis conducted by DEQ demonstrated to DEQ's satisfaction that emissions from a concrete batch plant facility that meets the criteria specified in Table 1 will not cause or significantly contribute to a violation of any air quality standard.

Attachment 1.
Sample Emissions Calculation – 3,600 cy/day and 500,000 cy/year

CRITERIA POLLUTANT EMISSION INVENTORY for Truck Mix Portable Concrete Batch Plant

Facility Information 3/20/07 17:37

Company:	DEQ GENERIC MODEL - 3,600 cy/day and 500,000 cy/year
Facility ID:	777-xxxxxx
Permit No.:	P-2007.xxxx
Source Type:	Portable Concrete Batch Plant
Manufacturer/Model:	

Assumptions Implied or Stated in Application:
Presumes this is an initial permit, not a modification
See control assumptions
Truck Mix (T) or Central Mix (C)? T

INCREASE IN Production[1]

Maximum Hourly Production Rate:	300	cy/hr		
Proposed Daily Production Rate:	3,600	cy/day	12.00	Hours of operation per day at max capacity
Proposed Maximum Annual Production Rate:	500,000	cy/year		
Cement Storage Silo Capacity:		ft³ of aerated cement		
Cement Storage Silo Large Compartment Capacity for cement only:		of the silo capacity		
Cement Storage Silo small Compartment Capacity for cement or ash:		of the silo capacity		

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Black text or numbers indicates it's hard-wired or calculated.
Review these before you change them.

Change in PM_{10} Emissions due to this PTC

Emissions Point	PM_{10} Emission Factor[1] (lb/cy)		Controlled Emission Rate, Max.	Controlled Emission Rate, 24-hour average		Controlled Emission Rate, annual average		Control Assumptions:	
	Controlled	Uncontrolled	lb/hr[2]	lb/hr[3]	lb/day[3]	lb/hr[4]	T/yr[4]		
Aggregate delivery to ground storage		0.0031	0.23	0.116	2.79	0.044	0.194	75%	Control: Water sprays
Sand delivery to ground storage		0.0007	0.05	0.026	0.63	0.010	0.044	75%	Control: Water sprays
Aggregate transfer to conveyor		0.0031	0.23	0.116	2.79	0.044	0.194	75%	Control: Water sprays
Sand transfer to conveyor		0.0007	0.05	0.026	0.63	0.010	0.044	75%	Control: Water sprays
Aggregate transfer to elevated storage		0.0031	0.23	0.116	2.79	0.044	0.194	75%	Control: Water sprays
Sand transfer to elevated storage		0.0007	0.05	0.026	0.63	0.010	0.044	75%	Control: Water sprays
Cement delivery to Silo (controlled EF)	0.0001		2.50E-02	1.25E-02	3.00E-01	4.76E-03	2.09E-02	0.00%	Baghouse is process equipment
Cement supplement delivery to Silo (controlled EF)	0.0002		5.36E-02	2.68E-02	6.44E-01	1.02E-02	4.47E-02	0.00%	Baghouse is process equipment
Weigh hopper loading (sand & aggregate batcher loading)		0.0040	1.19E-02	6.93E-03	1.42E-01	2.26E-03	9.88E-03	99.00%	Baghouse is process equipment
Truck mix loading, Table 11.12-2, "0.278 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete) / 2000 lb = 0.0784 lb/cy		0.0784	1.18	0.59	14.11	0.22	0.98	95.00%	Control: Automatic boot or equivalent
Central mix loading, Table 11.12-2, "0.134 lb/ton of cement+flyash" x ((491 lb cement + 73 lb flyash)/cy concrete) / 2000 lb = 0.0378 lb/cy		0.0000	0.00	0.00	0.00	0.00	0.00	95.00%	Control: Automatic boot or equivalent
Point Sources Total Emissions		4.21E-03	9.05E-02	4.53E-02	1.09E+00	1.72E-02	7.64E-02		
Process Fugitive Emissions		0.0898	2.03	1.02	24.38	0.39	1.69		
Facility Wide Total, Point Sources + Process Fugitives (Except for Road Dust and Windblown Dust)		0.0940	2.12	1.06	25.47	0.40	1.77		

lb/hr 24-hr Annual
0.285 0.109
0.143 0.054
3.93E-02 1.50E-02

POINT SOURCE EMISSIONS for FACILITY CLASSIFICATION[6]		Controlled EF	at 2,628,000 cy/yr	T/yr
Facility Classification Total PM[5]		5.08E-03		6.67E+00
Facility Classification Total PM10[5]		3.02E-04		3.97E-01

[1] The EFs were calculated using EFs in lb/ton of material handled from Table 11.12-2, typical composition per cubic yard of concrete (1865 lb aggregate, 1428 lbs sand, 491 lbs cement, 73 lbs cement supplement, and 20 gallons of water = 4024 lb/cy), and closely match Table 11.12-5 values (version 6/06) when rounded to the same number of figures. AP-42 lists the same EFs for uncontrolled and controlled emissions, so control estimates are based on the assumed control levels input on the right hand side of the table.

[2] Max. hourly rate includes reductions associated with control assumptions

[3] Hourly emissions rate (24-hr average) = Max.hourly emissions rate x (hrs per day) / 24.
Daily emissions rate = max emissions rate (1-hr average) x proposed hrs/day.

[4] Annual average hourly emissions rate = EF (lb/cy) x proposed annual production rate (cy/yr) / (8760 hr/yr).
Annual emissions rate = EF (lb/cy) x proposed annual production rate (cy/yr) /(2000 lb/T)

[5] Controlled EFs for PM = 0.0002 (cement silo) + 0.0003 (flyash silo) + 0.0079(weigh batcher)*(1-controlWB)
for PM10 = 0.0001 (cement silo) + 0.0002 (flyash silo) + 0.0040 (weigh batcher)*(1-controlWB)

[6] Emissions for Facility Classification are based on baghouses as process equipment, 24-hr day, 8760 hr/yr = 7,200 cy/day, and 2,628,000 cy/yr

Load emissions			Increase in Emissions from this PTC				Emissions for Facility Classification	
Emissions Point	Lead Emission Factor[1] (lb/ton of material loaded)		Emission Rate, Max.	Emissions for Comparison with DEQ Modeling Threshold		Emission Rate, Quarterly		
	Controlled with fabric	Uncontrolled	lb/hr, 1-hr avg.[2]	lb/month[3]	T/yr[4]	lb/hr qtrly avg[5]		T/yr
Cement delivery to silo [2]	1.09E-08	[illegible]	8.03E-07	2.93E-04	1.34E-03	4.01E-07	Point Source	3.52E-06
Cement supplement delivery to Silo [3]	5.20E-07	ND	5.69E-06	2.08E-03	9.49E-03	2.85E-06	Point Source	2.49E-05
Truck Loadout (with l29% control)		3.62E-06	1.53E-05	5.59E-03	2.55E-02	7.66E-06	Fugitive	
Central Mix (with l30% control)		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	Fugitive	
Total			2.18E-05	7.96E-03	0.036		Point Sources	2.85E-05
DEQ Modeling Threshold				100	0.6			
Modeling Required?				No	No			

[1] The emissions factors are from AP-42, Table 11.12-8 (version 06/06)
[2] Max. hourly rate = EF x pound of cement/yd³ of concrete x max. hourly concrete production rate/(2000 lb/T)
[3] lb/mo = EF x pound of material/yd³ of concrete x max. daily concrete production rate x (365/12)/(2000 lb/T)
[4] T/yr = EF x pound of material/yd³ of concrete x max. annual concrete production rate/(2000 lb/T)
[5] lb/hr, qtrly avg = lb/mo x 3 months per qtr / (8760/4)hrs per qtr

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Toxic Air Pollutant (TAPs) EMISSIONS INVENTORY, Truck Mix Concrete Batch Plant

3/20/2007 17:37

Facility Information

Company:	DEQ GENERIC MODEL - 3,600 cy/day and 500,000 cy/year
Facility ID:	777-xxxxxx
Permit No.:	P-2007.xxxx
Source Type:	Portable Concrete Batch Plant
Manufacturer:	0

Emissions estimates are based on EFs in AP-42, Table 11.12-8 (version 06/06) and the following composition of one yard of concrete:

Coarse aggregate		1865 pounds
Sand		1428 pounds
Cement		491 pounds
Cement supplement		73 pounds
Water		20 gallons
Concrete		4024 pounds

Truck Mix Loadout Factor: 1

Central Mix Batching Factor: 0

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Black text or numbers indicates it's hard-wired or calculated.
Review these before you change them.

Increase in Production

Maximum Hourly Production Rate	300	cy/hr	
Proposed Daily Production Rate	3,600	cy/day	
Proposed Maximum Annual Production Rate	500,000	cy/year	

Uncontrolled (Unlimited Production Rate)

	24 hrs/day,
7,200 cy/day	7 day/wk,
2,628,000 cy/year	52 wks/year

TAP Emission Factors from AP-42, Table 11.12-8 (Version 06/06)

Emissions Point	Arsenic EF (lb/ton of material loaded)		Beryllium EF (lb/ton of material loaded)		Cadmium EF (lb/ton of material loaded)		Chromium EF (lb/ton of material loaded)		Manganese EF (lb/ton of material loaded)		Nickel EF (lb/ton of material loaded)		Phosphorus EF (lb/ton of material loaded)		Selenium EF (lb/ton of material loaded)		Chromium VI
	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Controlled with Fabric filter	Uncontrolled	Percent of total Cr that is Cr+6
Cement delivery to silo (with baghouse)	4.24E-09	[illegible]	4.86E-10	[illegible]	4.86E-10	[illegible]	2.90E-08	[illegible]	1.17E-07	[illegible]	4.18E-08	[illegible]	ND	1.18E-05	ND	ND	20%
Cement supplement delivery to Silo (with baghouse)	1.00E-06	ND	9.04E-08	ND	1.98E-08	ND	1.22E-06	ND	2.56E-07	ND	2.28E-06	ND	3.54E-06	ND	7.24E-08	ND	30%
Truck Loadout (no boot or shroud)	[illegible]	3.04E-06	[illegible]	2.44E-07	[illegible]	3.42E-08	[illegible]	1.14E-05	[illegible]	6.12E-05	[illegible]	1.15E-05	[illegible]	3.84E-05	[illegible]	2.62E-06	21.29%
Central Mix Batching (NO boot or shroud)	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	21.29%

UNCONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment. 7,200 cy/day, and 2,628,000 cy/yr

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg	T/yr[4]	lb/hr annual avg	T/yr	lb/hr annual avg	T/yr	lb/hr 24-hr avg	T/yr[5]	lb/hr 24-hr avg	T/yr	lb/hr annual avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr annual avg
Cement delivery to silo (with baghouse)	3.12E-07	1.37E-06	3.58E-08	1.57E-07	3.58E-08	1.57E-07	2.14E-06	8.13E-05	8.62E-06	3.77E-05	3.08E-06	1.35E-05	[illegible]	3.81E-03	ND	ND	4.27E-07
Cement supplement delivery to Silo (with baghouse)	1.10E-05	4.80E-05	9.90E-07	4.34E-06	2.17E-07	9.50E-07	1.34E-05	5.85E-05	2.80E-06	1.23E-05	2.50E-05	1.09E-04	3.88E-05	1.70E-04	7.93E-07	3.47E-06	4.01E-06
Truck Loadout (NO boot or shroud)	2.57E-04	1.13E-03	2.06E-05	9.04E-05	2.89E-06	1.27E-05	9.84E-04	4.22E-03	5.18E-03	2.27E-02	1.01E-03	4.41E-03	3.25E-03	1.42E-02	2.22E-04	9.71E-04	2.05E-04
Central Mix Batching (NO boot or shroud)	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00
Sources Total	2.68E-04	1.18E-03	2.17E-05	9.49E-05	3.15E-06	1.38E-05	9.80E-04	4.36E-03	5.19E-03	2.27E-02	1.03E-03	4.53E-03	4.16E-03	1.82E-02	2.22E-04	9.74E-04	2.10E-04
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07
EXCEEDS EL?	Yes		No		No		No		No		Yes		No		No		Yes

Facility Classification: Total Annual HAPs Emissions
5.21E-02 Tons per year

2.1394E-06 5.33E-06 8.443E-07

CONTROLLED TAP EMISSIONS Note: Includes baghouses as process equipment. 3,600 cy/day, and 500,000 cy/year

Emissions Point	Arsenic		Beryllium		Cadmium		Chromium		Manganese		Nickel		Phosphorus		Selenium		Chromium VI
	lb/hr annual avg	T/yr[4]	lb/hr annual avg	T/yr	lb/hr annual avg	T/yr	lb/hr 24-hr avg	T/yr[5]	lb/hr 24-hr avg	T/yr	lb/hr annual avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr 24-hr avg	T/yr	lb/hr annual avg
Cement delivery to silo (with baghouse)[1]	5.94E-08	2.60E-07	6.81E-09	2.98E-08	6.81E-09	2.98E-08	1.07E-06	1.78E-06	4.31E-06	7.18E-06	5.86E-07	2.57E-06	ND	ND	ND	ND	8.13E-08
Cement supplement delivery to Silo (with baghouse)[2]	2.08E-06	9.13E-06	1.88E-07	8.25E-07	4.13E-08	1.81E-07	4.49E-05	1.11E-05	9.43E-06	2.34E-06	4.75E-06	2.08E-05	1.30E-04	3.23E-05	3.96E-07	6.61E-07	7.63E-07
Truck Loadout (WITH boot or shroud)	2.45E-06	1.07E-05	1.96E-07	8.60E-07	2.75E-08	1.21E-07	2.41E-05	4.02E-05	1.29E-04	2.16E-04	9.58E-06	4.19E-05	8.12E-05	1.35E-04	5.54E-06	9.24E-06	1.95E-06
Central Mix Batching (WITH boot or shroud)	0.00E+00	0.00E+00	ND	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ND	ND	0.00E+00
Sources Total	4.59E-06	2.01E-05	3.92E-07	1.71E-06	7.56E-08	3.31E-07	7.01E-05	5.31E-05	1.43E-04	2.25E-04	1.49E-05	6.53E-05	2.12E-04	1.68E-04	5.94E-06	9.90E-06	2.80E-06
IDAPA Screening EL (lb/hr)	1.50E-06		2.80E-05		3.70E-06		3.30E-02		3.33E-01		2.70E-05		7.00E-03		1.30E-02		5.60E-07
Percent of EL	305.95%		1.40%		2.04%		0.21%		0.0430%		55.23%		3.02%		0.0457%		499.55%
EXCEEDS EL?	Yes		No		No		No		No		No		No		No		Yes

Truck Loadout: 95.00% Control Automatic boot or equivalent
Central Mix Batching: 95.00% Control Automatic boot or equivalent

5.43E-04 Tons per year

[1] lb/hr, annual average = EF x pound of cement / Yd^3 of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr = EF x pound of cement / Yd3 of concrete x daily concrete production rate / 2000lb/Ton / 24 hr/day
[2] lb/hr, annual average = EF x pound of cement supplement / Yd^3 of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of cement supplement / Yd3 of concrete x daily concrete production rate / 2000lb/Ton
[3] lb/hr, annual average = EF x pound of (cement + cement supplement) / Yd^3 of concrete x annual concrete production rate / 2000lb/Ton / 8760 hr/yr; lb/hr, 24-hr average = EF x pound of (cement + cement supplement) / Yd3 of concrete x daily concrete production
[4] T/yr = lb/hr, annual avg x 8760 hr/yr x (1T/2000 lb)
[5] T/yr = EF x pound of cement, or cement supplement, or cement + cement supplement x annual concrete production rate /2000 lb/ton / 2000 lb/ton

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Attachment 2.
"Fenceline" Radius Calculations

Concrete Batch Plant - Typical Plant Layout Modeling 3/9/2007

"Fenceline" or Ambient Air Boundary Coordinates

Radians = deg * Pi/180
x = Xoffset + c cos (Angle)
y= Yoffset + c sin(Angle)

CASE 1, 40 meter RADIUS

Radius c	40	(meters)
Origin Offset	0	(meters)
Origin Offset	0	(meters)

Angle (degrees)	EAST (x)	NORTH (y)
10	39.39	6.95
20	37.59	13.68
30	34.64	20.00
40	30.64	25.71
50	25.71	30.64
60	20.00	34.64
70	13.68	37.59
80	6.95	39.39
90	0.00	40.00
100	-6.95	39.39
110	-13.68	37.59
120	-20.00	34.64
130	-25.71	30.64
140	-30.64	25.71
150	-34.64	20.00
160	-37.59	13.68
170	-39.39	6.95
180	-40.00	0.00
190	-39.39	-6.95
200	-37.59	-13.68
210	-34.64	-20.00
220	-30.64	-25.71
230	-25.71	-30.64
240	-20.00	-34.64
250	-13.68	-37.59
260	-6.95	-39.39
270	0.00	-40.00
280	6.95	-39.39
290	13.68	-37.59
300	20.00	-34.64
310	25.71	-30.64
320	30.64	-25.71
330	34.64	-20.00
340	37.59	-13.68
350	39.39	-6.95
360	40.00	0.00

CASE 2, 60 meter RADIUS

Radius c	60	(meters)
Origin Offset	0	(meters)
Origin Offset	0	(meters)

Angle (degrees)	EAST (x)	NORTH (y)
10	59.09	10.42
20	56.38	20.52
30	51.96	30.00
40	45.96	38.57
50	38.57	45.96
60	30.00	51.96
70	20.52	56.38
80	10.42	59.09
90	0.00	60.00
100	-10.42	59.09
110	-20.52	56.38
120	-30.00	51.96
130	-38.57	45.96
140	-45.96	38.57
150	-51.96	30.00
160	-56.38	20.52
170	-59.09	10.42
180	-60.00	0.00
190	-59.09	-10.42
200	-56.38	-20.52
210	-51.96	-30.00
220	-45.96	-38.57
230	-38.57	-45.96
240	-30.00	-51.96
250	-20.52	-56.38
260	-10.42	-59.09
270	0.00	-60.00
280	10.42	-59.09
290	20.52	-56.38
300	30.00	-51.96
310	38.57	-45.96
320	45.96	-38.57
330	51.96	-30.00
340	56.38	-20.52
350	59.09	-10.42
360	60.00	0.00

CASE 3, 100 meter RADIUS

Radius c	75	(meters)
Origin Offset	0	(meters)
Origin Offset	0	(meters)

Angle (degrees)	EAST (x)	NORTH (y)
10	73.86	13.02
20	70.48	25.65
30	64.95	37.50
40	57.45	48.21
50	48.21	57.45
60	37.50	64.95
70	25.65	70.48
80	13.02	73.86
90	0.00	75.00
100	-13.02	73.86
110	-25.65	70.48
120	-37.50	64.95
130	-48.21	57.45
140	-57.45	48.21
150	-64.95	37.50
160	-70.48	25.65
170	-73.86	13.02
180	-75.00	0.00
190	-73.86	-13.02
200	-70.48	-25.65
210	-64.95	-37.50
220	-57.45	-48.21
230	-48.21	-57.45
240	-37.50	-64.95
250	-25.65	-70.48
260	-13.02	-73.86
270	0.00	-75.00
280	13.02	-73.86
290	25.65	-70.48
300	37.50	-64.95
310	48.21	-57.45
320	57.45	-48.21
330	64.95	-37.50
340	70.48	-25.65
350	73.86	-13.02
360	75.00	0.00

CASE 4, 125 meter RADIUS

Radius c	125	(meters)
Origin Offset :	0	(meters)
Origin Offset '	0	(meters)

Angle (degrees)	EAST (x)	NORTH (y)
10	123.10	21.71
20	117.46	42.75
30	108.25	62.50
40	95.76	80.35
50	80.35	95.76
60	62.50	108.25
70	42.75	117.46
80	21.71	123.10
90	0.00	125.00
100	-21.71	123.10
110	-42.75	117.46
120	-62.50	108.25
130	-80.35	95.76
140	-95.76	80.35
150	-108.25	62.50
160	-117.46	42.75
170	-123.10	21.71
180	-125.00	0.00
190	-123.10	-21.71
200	-117.46	-42.75
210	-108.25	-62.50
220	-95.76	-80.35
230	-80.35	-95.76
240	-62.50	-108.25
250	-42.75	-117.46
260	-21.71	-123.10
270	0.00	-125.00
280	21.71	-123.10
290	42.75	-117.46
300	62.50	-108.25
310	80.35	-95.76
320	95.76	-80.35
330	108.25	-62.50
340	117.46	-42.75
350	123.10	-21.71
360	125.00	0.00